c. Ohama coal mine, Ube area

(1) This mine is located on the Motoyama peninsula and is on the west shore of the sea, with slopes running under the sea and all mining done undersea. The Nanako seam, which is being mined, is 1.6 meters thick, dips 10° S and strikes N.W - S.E. The bed lies about 150 meters below the sea floor. Mining is done by the advancing longwall system, using pneumatic picks and loading on chain conveyers. One coal-cutting machine is also used, with face length of 40 meters. Production is being increased with development, and 55,000 tons were mined in 1947. A goal of 100,000 tons is set for 1948. Workings run two kilometers undersea, and all coal is shipped by boat after hand-picking and screening for size. It is loaded from the preparation plant by belt conveyers directly into boats, which deliver part of the coal to various Kyushu ports for chemical industry use, rayon factories, and a soda factory. Part goes to Ube city, where it is used for gas producing and by the nitrogen plant.

(2) One main 180-HP fan is used for ventilation, delivering 2,830 cubic meters per minute at 198 millimeters. The mine makes very little water, which is handled by turbine pumps in series to surface. Adjustable steel props are used successfully at the face; after a cut has been mined, these props are removed for reuse. About 10,000 tons of coal per month are now being mined, which gives an average of 7.2 tons per man per month. Two hundred tons per day are mined with the mechanical coal cutter, using a crew of 29 men. A new Baum washer is being installed and will be in operation by 1949.

d. Okiube coal mine, Ube area

(1) This mine is east of Ube city and is an undersea operation. It was started in 1936. During the war, the surface plant was bombed and the mine was flooded. It was not completely rehabilitated until 1947. Mine lot area covers about 5.6 square kilometers, of which 95 percent is undersea.

(2) The seams mined are the Nidan and the Sanjaku; reserves proved on the Nidan total 710,900 tons and on the Sanjaku, 1,614,000 tons, making a total of 2,325,000 tons, of which 50 percent will be recoverable. Possible

reserves are estimated at 4,468,000 tons. The Nidan seam, 70 meters below the surface, is 0.6 meters thick and lies 10 meters above the Sanjaku seam, which is 1.6 meters thick (1.4 meters mineable coal). The coal dips an average of 4° S and strikes E.W. The retreating longwall method is used for mining, with 40-meter faces. Pneumatic picks are used for breaking coal at the face. Chain conveyers move coal to haulage drifts; endless ropes move cars through the main haulage tunnel, a distance of 1.7 kilometers; at the slope the coal is hoisted to the surface. There is at present a caved area at a fault zone, which has necessitated bulkheading of one section of the haulage level. This must be caught up and the roof cemented, before this area can be mined further. This is planned to be done this year. No sea water has entered, but the condition is dangerous and similar to the cave in the Chosei mine, which was flooded recently. Ventilation is by the main Sirocco suction fan at the slope mouth, and normal mine water is pumped by turbines, which pump three cubic meters per minute. Water volume is steadily decreasing each year.

(3) Planned production for 1948 was placed at 137,500 tons, but the cave and several strikes will cut actual production to 120,000 tons. Coal is hand-picked and screened for size at the surface dressing plant. About 30 percent of production is used by Ube Nitrogen Co, with 65 percent going to general industries in southern Honshu, which include electric generating plants, a rayon plant at Osaka, and small plants along the Yamaguchi Prefecture coast, including 5 percent that is used in salt manufacturing at Shikoku. A Baum washer is planned to be installed next year. Present labor force consists of 1,500 men, with 820, or 54 percent, working underground. An average of 6.5 tons per man per month production is somewhat lower than that at most of the mines in the district.

d. Daini Suzumeda coal mine

(1) This mine is located near Ube city, to the north of the Nagasawa mine, in an extensive farming area. Surface land subsidence after coal removal is a serious problem here. The mining lots cover 1,859 kilometers and contain two flat-lying coal seams, the Futaeishi and Nanako, which are 42 meters below surface. The main tonnage comes from the Nanako, which is 1.8 meters thick (1.5 meters mineable coal). These seams dip 2° S and strike E. W. Both

retreating longwall and room and pillar systems are used to mine coal, which is loaded directly from the face into 0.5-ton cars, trammed by hand to the main haulage way. Pneumatic picks are used to break coal from the face. Natural ventilation is achieved with air shafts to the surface. Open carbide lamps are used, as the mine is not gassy. The mine makes about 30 cubic feet of water per minute, which does not increase much in the rainy season, as surface water does not penetrate sandstone capping. Production in 1947 was 67,000 tons and the coal is the same grade as at the other Ube mines, averaging about 4,200 calories. Planned production for 1948 is 75,000 tons. About 30 percent is used locally for gas production in Ube city, and 70 percent is shipped by railroad to Tokuyama city for boiler use and for low-temperature distillation. Proved reserves amount to 540,000 tons, with possible coal estimated at 2,601,500 tons, of which 63 percent is considered recoverable. A total of 504 people are employed, with 267 men underground, which is 47 percent of the total. Production is 15 metric tons per man per month, which is high for Japan. This mine is extremely well run, with conditions conducive to steadily increasing production in 1948.

e. Motoyama coal mine, Ube area

(1) This mine is located at the end of the Motoyama peninsula and adjoins on the east the new Nishiokinoyama mine, which is a new reclamation project. The mine is an undersea operation that was originally opened in 1910. In 1944, the Ube Industrial Co acquired and started a modernized property, extending undersea workings through a series of undersea faults. A new slope was put down, using a belt conveying system to bring coal to the surface. During the war, due to air raids on Ube city, electric power was cut off, causing flooding of the deeper portions of the mine. These proved impossible to rehabilitate. Therefore, a new section is being worked, and about 5,000 tons per month are mined now. The main seam mined is the Itsuden, which is 1.74 meters thick, dips 4 - 5° S and strikes N.E. - S.W. Mining is done by retreating longwall system, using belt conveyers at the face. Natural caving is allowed, as the face retreats. Pneumatic picks are used to break coal at the face. Ventilation is by suction fan at the slope mouth, and water is removed with turbine pumps. About

1.1 cubic meters per minute are pumped. The Itsuden seam coal is extensively used in the Ube city chemical plants and averages 5,500 calories, with 9.4 percent water, 18 percent ash, and 1.95 percent sulfur content.

(2) After the coal is brought to the surface by belt conveyor directly to the dressing plant, it is hand-picked, sized, and fines are washed, using Baum washers of 30 and 75 tons-per-hour capacity, respectively. A total of 1,489 persons are employed, with 918 underground, which is 61.7 percent of the total.

(3) The mine is being steadily developed and additional coal is being blocked. The property contains a mining area of 37 square kilometers. Proved coal reserves total 23,000,000 tons, of which 40 percent can be mined. Possible coal is calculated at 9,200,000 tons. This mine will produce 10,000 tons per month, as the new faces are opened up.

f. Nishiokinoyama coal mine, Ube area

(1) This mine is a new development, owned by Ube Industrial Co. As the coal is too close to the surface to mine safely undersea, an extensive project was started in 1941 to build a quay wall around a shallow cover section, then to drain seawater and fill the area to above sea level. The quay wall, which is about two kilometers in circumference, will give 10 square kilometers of reclaimed land and has been a very extensive project to undertake, due to its cost and size. It is now 90 percent completed and will be finished in 1949. The coal will be mined, using slopes located in reclaimed area; it is planned also to connect workings with the Nagasawa mine, and coal will be loaded by belt conveyors directly into ships which can dock at the quay side. The mine plans and details are described in a report on West Honshu coal mines now being prepared.

g. Enokiyama anthracite coal mine, Omine area

(1) This mine property is located adjoining the mine lots of the Sanyo Muen mine, owned by Ube Industrial Co, which produces about one-half of the total anthracite coal mined in the area. The mine's location is 4.5 kilometers from the town of Omine, the rail shipping point. Coal is

brought out of the mine by 0.5-ton cars and carried on endless rope haulage track, which takes it to the railway loading point at Omine at the rate of 40 tons per hour.

(2) The seams are a continuation of those on the Sanyo property, and two are suitable for mining, the upper and lower seams. The dip averages about 27° W and strike is N-S. At present only the upper, or Joso, seam is worked, using the room and pillar system, with iron troughs to pass coal by gravity to haulage levels into cars, where it is taken by endless rope haulage and by hoisting up the slope to the surface. Present production is about 3,000 tons per month, or a total 36,410 tons in 1947. Augers and pneumatic picks are used to break coal from the face. The coal has been subjected to considerable crushing, so that over 50 percent comes out as fines, when mined. This operation is typical of the 19 smaller mines in the area, most of which are not well planned for extensive mining, but which, taken together, account for about one-half of the field's production.

(3) Plans are now being made for a new section and entry, which will enable the mine to double its output next year. Proved reserves are 4,253,000 tons, of which 3,615,000 tons are figured to be recoverable. The mine makes about 100 cubic feet of water per minute, which is handled by turbine pumps in two stages. Natural ventilation is used. The coal is shipped by railway to Ube city, for ship and rail transportation to Osaka and Nagoya, where it is made into commercial briquettes and is also used in power and industrial plants. Underground workers number 169. Surface workers number 146, and the office and staff, 36, making a total of 351 employed. The coal from the upper seam mined carries 3.5 percent moisture, 35 percent ash, 0.50 percent sulfur, and 4,800 calories.

h. Sanyo Wuen mine, Omine area

(1) This property is one of the model mines of Japan with respect to its layout, its use of coal classification machinery underground and belt conveying to the surface. Description anddata are covered in detail in a report on West Honshu coal mines now being processed. Mining methods used in driving their large rock haulage drifts were not modernized. A standardization of methods as used in the United States was set up, on a visit of NR engineers, and is now being tried out, with a close check to be made as to costs and efficiency obtained.

NR 631 (3 Sep 48)MG

i. General

(1) Conferences were held with labor representatives at mines, and plans as to better cooperation with management were discussed. Conferences were held with the West Japan Coal Assn; general plans as to increased production were explained, and the subject of land subsidence payment procedure was outlined.

1 Incl
Itinerary and Personnel Interviewed

Copy furnished:
Yamaguchi MG Tm

R. D. MacAFEE
Scientific Consultant
Mining and Geology Division

Itinerary:

Aug 2-0930 Left Tokyo

3-0900 Arrived Ogori, proceeded to Yamaguchi city and Ube city

12-1500 Left Ube city

1730 Left Ogori

13-1830 Arrived Tokyo

Personnel Interviewed:

Yamaguchi Military Government Team: Maj Wiggins

Japanese Nationals:

T. Yamada, chief, Ube Coal Bureau, West Japan Coal Assn
M. Kunizaki, chief, Western Coal Assn
T. Taketoshi, director, Western Coal Assn
W. Fujii, chief, Mining, Western Coal Assn
K. Shinozaki, owner, Okuibe Coal Mine
K. Katayama, owner, Onoyama Coal Mine
T. Kashiki, chief engineer, Onoyama Coal Mine
A. Maeda, mgr, Nagasawa Coal Mine
M. Yoshikawa, chief, Labor, Nagasawa Coal Mine
Z. Hamano, asst mgr, Okinoyama Coal Mine
H. Tawarada, mgr, Ube Industrial Co
H. Ota, mgr, Enokiyama Coal Mine
I. Kurokawa, chief engineer, Enokiyama Coal Mine
S. Okuno, chief, Mining Div, Sanyo Coal Mine
H. Funitsu, director, Ohama Coal Mine
R. Koto, chief engineer, Ohama Coal Mine
Y. Murata, manager and director, Motoyama Coal Mine
I. Hedaka, chief, Gen Off, Motoyama Coal Mine
T. Yamato, chief engineer, Motoyama Coal Mine
M. Matsumoto, mgr and director, Daini Suzumeda Coal Mine
H. Nagano, director, Ube Union of Coal mines
S. Takabatake, director, Ube Union of Coal Mines
M. Fugita, mgr, Onoda power plant

Incl 1 to Incl 1

BASIC: Ltr, Hq 8th Army, APO 343, AGMGEN 333.5, dtd 19 Jul 1948, subj: "Transmittal of Memorandum for Record ("Land Damage from Coal Mining in Yamaguchi Prefecture")."

CMGR 333.5 (D-Ki) 1st Ind

Headquarters, Chugoku Military Government Region, APO 317, Kure, Honshu, 23 July 1948

TO: Commanding Officer, Yamaguchi Military Government Team, APO 317

Forwarded for your information.

BY ORDER OF COLONEL SNYDER:

1 Incl,
n/c

JERRY W. TOM
1st Lt, USAF
Adjutant

NR FILE No 15

RC & I	
1	SEC.C
2	NR
3	C&T.
4	L.
5	CC.

your copy

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HEADQUARTERS EIGHTH ARMY
United States Army
Office of the Commanding General
APO 343

AGMGEN 333.5

SUBJECT: Transmittal of Memorandum for record (Land Damage from coal Mining in Yamaguchi Prefecture)

TO : Commanding Officer
Chugoku Military Government Region
APO 317

1. Attached as inclosure 1 is a memorandum for record, Natural Resources Section,General Headquarters, Supreme Commander for the Allied Powers,file NR 641 (23 Jun48)MG,23 June 1948,subject: "Land Damage from Coal Mining in Yamaguchi Prefecture,"prepared by Mr R.D. MacAfee,Scientific Consultant.

2. The subject memorandum for record will be forwarded to the Yamaguchi Military Government Team.

BY COMMAND OF LIEUTENANT GENERAL EICHELBERGER:

1 incl
Memo for record.
23 June 1948

R.SCHAFER
Lt Col,AGD
Asst Adj Gen

COPY

GENERAL HEADQUARTERS
SUPREME COMMANDER FOR THE ALLIED POWERS
Natural Resources Section

RGS/RYG/MacA/gs
23 June 1948

NR 641 (23 Jun 48)MG

MEMORANDUM FOR: Record

SUBJECT: Land Damage from Coal Mining in Yamaguchi Prefecture

1. Many of the coal seams in the mines in Ube City area are very shallow, averaging about 50 meters below surface, and when the coal is removed, land subsidence occurs, causing material damage to the surface for farming use, and to buildings. This situation is especially bad at the Onoda and Asa mines, located in a flat surface terrain which is intensively farmed.

2. After the war, mines paid indemnity only on a decrease in the yield of crops, and for damage to houses on a basis of personal settlement. Now, farmers are demanding much more, so that the owner of the mining rights is placed in a critically unfavorable position, because of his inability to meet the claims. The low government price of coal and increased costs are the factors contributing to the situation. The government and Yamaguchi Prefecture authorities appropriated a sum to aid for the fiscal year, but it was far too small an amount, compared with claims. The operators are petitioning that the budget be increased. Indemnification costs were ¥10,000,000 in 1946 and increased to ¥60,000,000 in 1947. At the present time demands are much greater and increasing beyond reason. In August 1947, an investigation by West Honshu Coal Federation computed that the following amount of money was necessary to cover indemnification:

AMOUNT OF INDEMNIFICATION ON CULTIVATED LAND

Item	Area or Number	Expense (yen)
Rice field	2,690 tan	89,274,550
Field	60 tan	1,000,000
Total	2,750 tan	90,274,550
Road	4,203 ken	1,283,800
Water channel	4,896 ken	1,488,800
Bank	213 ken	87,700
Pond	2	545,800
Bridge	2	42,500
Total		93,723,150

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Houses	905		63,867,951
Roads	28,563	meters	18,662,164
River banks	5,005	meters	2,083,432
Bridges	808		1,689,311
Water pipes	21,449	meters	4,010,347
Graveyards	621	tombs	779,325
Railroads	600	meters	600,000
Others (electric poles, underground cable			135,500
			185,551,180

3. The assessed amounts for damages to cultivated land by mining has been decided upon by the government:

District	Area Which Should be Recovered	Expense (yen)
Onoda	961.8 tan	43,198,100
Ube	856.9 tan	18,549,400
Funaki	159.8 tan	4,300,500
Asa	100.5 tan	4,512,300
Total	2,079 tan	70,560,300

CIVIL ENGINEERING WORK

Item	Meters		Expense (yen)
Roads	12,559	meters	10,714,649
Bridges	808		1,456,724
Rivers	2,202		1,753,578
Others (Not yet assessed)			69,392,623
Total			153,877,874

4. If the government can arrive at a set formula whereby the coal mine operators can know within reason what he will be assessed for, due to damage by subsidence in a specified area, it will then be possible to figure accordingly. The price allowed operators for coal in this area should be such that the operator can afford to continue to produce and meet a share of indemnities with a plan or fund set up to rehabilitate the land after subsidence.

Copies furnished:
ESS/IN (Coal Coord)
Yamaguchi MG Tm
NR/A

/s/ Robert D. MacAfee
/t/ ROBERT D. MacAFEE
Scientific Consultant
Mining and Geology Division

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GENERAL HEADQUARTERS
SUPREME COMMANDER FOR THE ALLIED POWERS
Namural Resources Section

HGS/RYG/RDM/Jm
7 July 1948

NR 641 (7 Jul 48)MG

MEMORANDUM FOR: Record

SUBJECT: Examination of Chosei Coal Mine, Ube City, Yamaguchi Prefecture, on 10 June 1948

A report on geological conditions at Chosei mine by Mr K. Sakakura, Chief Coal Geologist, Mitsubishi Coal Mining Co, is inclosed. Mr Sakakura accompanied Mr Robert MacAfee, NR, on an examination of this mine on 9 and 10 June 1948. Conclusions reached in this inclosure were concurred with by outside consultants retained by the Japanese Coal Board, who will submit a separate report.

/s/ Robert D. MacAfee
/t/ ROBERT D. MACAFEE
Scientific Consultant
Mining and Geology Division

1 Incl
As indic

Copy to:
Yamaguchi MG Tm

File Index
No. _____

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GEOLOGICAL EXAMINATION OF CHOSEI MINE CLAIMS AND PLANS,
UBE CITY, YAMAGUCHI PREFECTURE

1. Four bore holes were drilled some years ago for the purpose of proving continuation of undersea coal seams in undeveloped areas at Chosei mine. The holes are considered inaccurate in coal thickness and depth because they were made by Kazusa-bori (Percussion method using bamboo bars), but the existence of coal seams in area drilled is considered to be certain.

2. Correlation of the coal seams between Chosei and Okinoyama-Okiube districts is not definitely now established, although seams have the same name, that is, the name Istudan and Cha are being used by Chosei Mine Co. According to the engineers of the Okinoyama and the Okiube mines, coal seams in the Chosei claims may be seams of a lower horizon than the Itsudan seam. On the other hand, Coal Bureau engineers think the resemblance of the columnar sections of the coal seam at Chosei (so-called Itsudan) is the same as the Itsudan. The correlation of these seams remains to be established, but it is certain that the majority of Chosei claims contain coal of suitable thickness to be mined.

3. The western part of the area planned to be exploited by Chosei mine should be studied further by rotary drilling, as there is some possibility of erosion of coal seams to the westward due to their wavy contour. At the west of the old third pit, on land, a north-south trending, narrow and shallow syncline is recognized and metamorphosed basement rocks crop out to the west of the Tertiary formations for some distance and extend to the east end of Okiube mine area. From Okiube westward, a number of coal mines are now being worked. Coal seams become shallower to the east; the Okiube mine is situated at the eastern end of that district. The Sanjyaku seam (lowest workable seam) is now being worked there. This seam has maximum dip of $3^{0}30'W$. According to recent studies by geologists of Ube Industrial Co, "the fault that is considered to bound Chosei and Okiube districts is not existent".

4. The undersea condition with the thin overburden between coal seams and the sea at Chosei mine requires more surveying drilling before settling on a large development plan, for the following reasons:

(1) The surface of the basement rocks are very irregular (as seen from study of underground rock of Chosei mine) and as shown by the coal seam, which is located near the base rocks. Therefore, it is probable that the coal seam is affected by irregularity of basement topography.

(2) In the Okinoyama mine, which is extensively developed, there are undulations of the coal seams (wavy geological structure) some of these waves have a difference of level of about 30 meters between highest and lowest points of the undulation. This kind of undulation will cause suspension of mining where cover rocks are too thin, as in the Chosei mine at certain points.

5. The present development slope and level tunnels have been run in an unfavorable place, where the coal seam is not far below sea bottom and is too near to the unconformity surface of basement rocks to be safe. The most basal

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part of Tertiary formation, consisting of subangular gravels of schists and serpentine derived from basement rock, is not quite strong enough to resist erosion and also there may be water-bearing strata in some places in these upper beds. (A special case of this condition in the Chosei mine was that sea water came down through fractures, causing roof falls). On the other hand, water in basement rock, generally, has no direct connection to sea-water. Therefore, it is desirable that tunnels should be run in basement rocks until they strike Tertiary sediments with sufficient overburden about them to be safe from sea water seepages. If present tunnels should be maintained, the sea area above slope and part of the level will have to have a barrier seawall put in and be filled with clay to a depth above sea level.

6. Conclusions: (1) More surveys are needed in the western half of planned mining area; (2) though this area is promising in regard to coal reserves (probably over 25,000,000 tons), the development plan should be revised, or reclamation of sea area near shore should be carried on by extensive filling, before opening or continuing of mine as it is now set up.

/s/ K. Sakakura
/t/ K. SAKAKURA
Chief Coal Geologist, Mitsubishi Mining Co.

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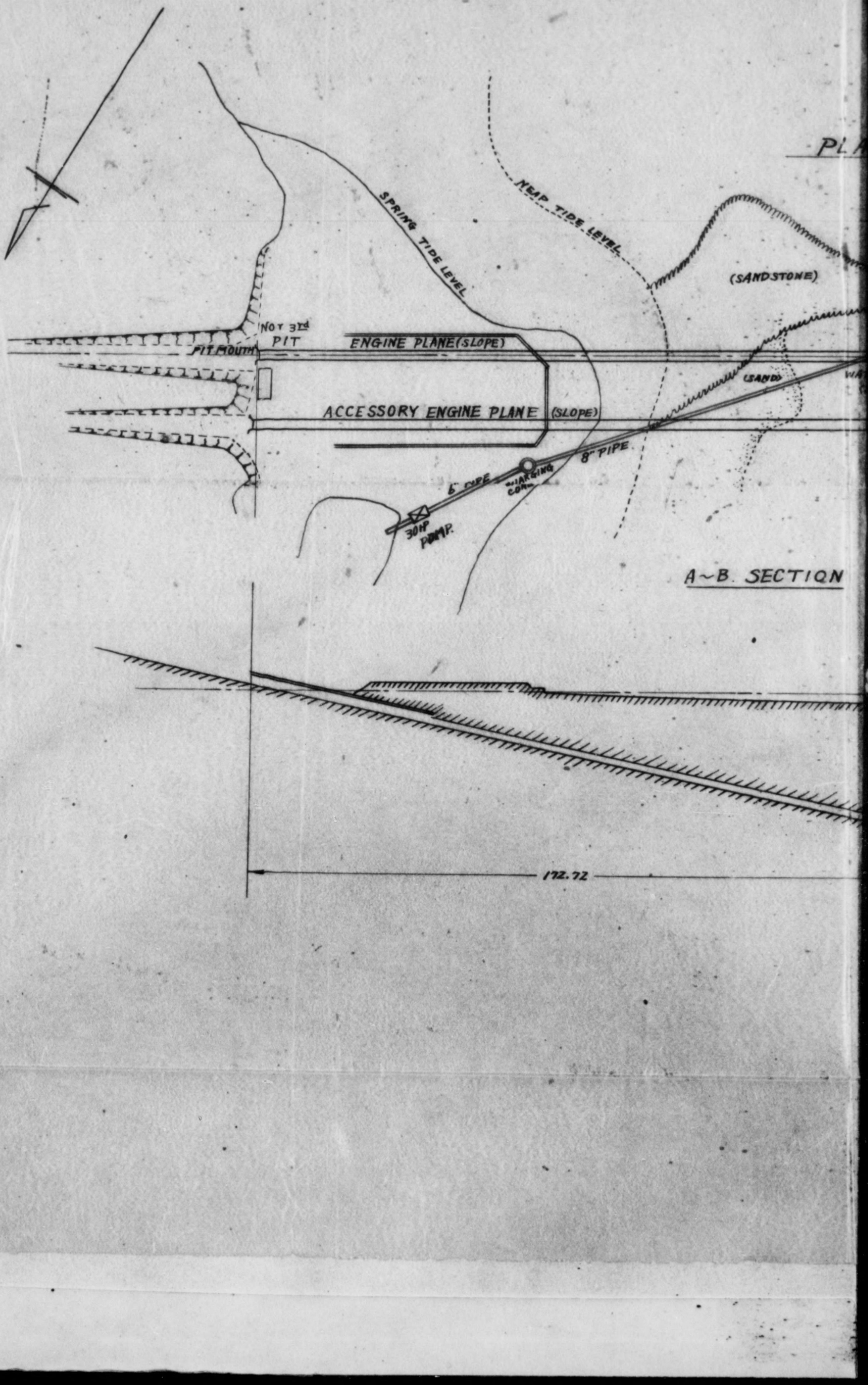

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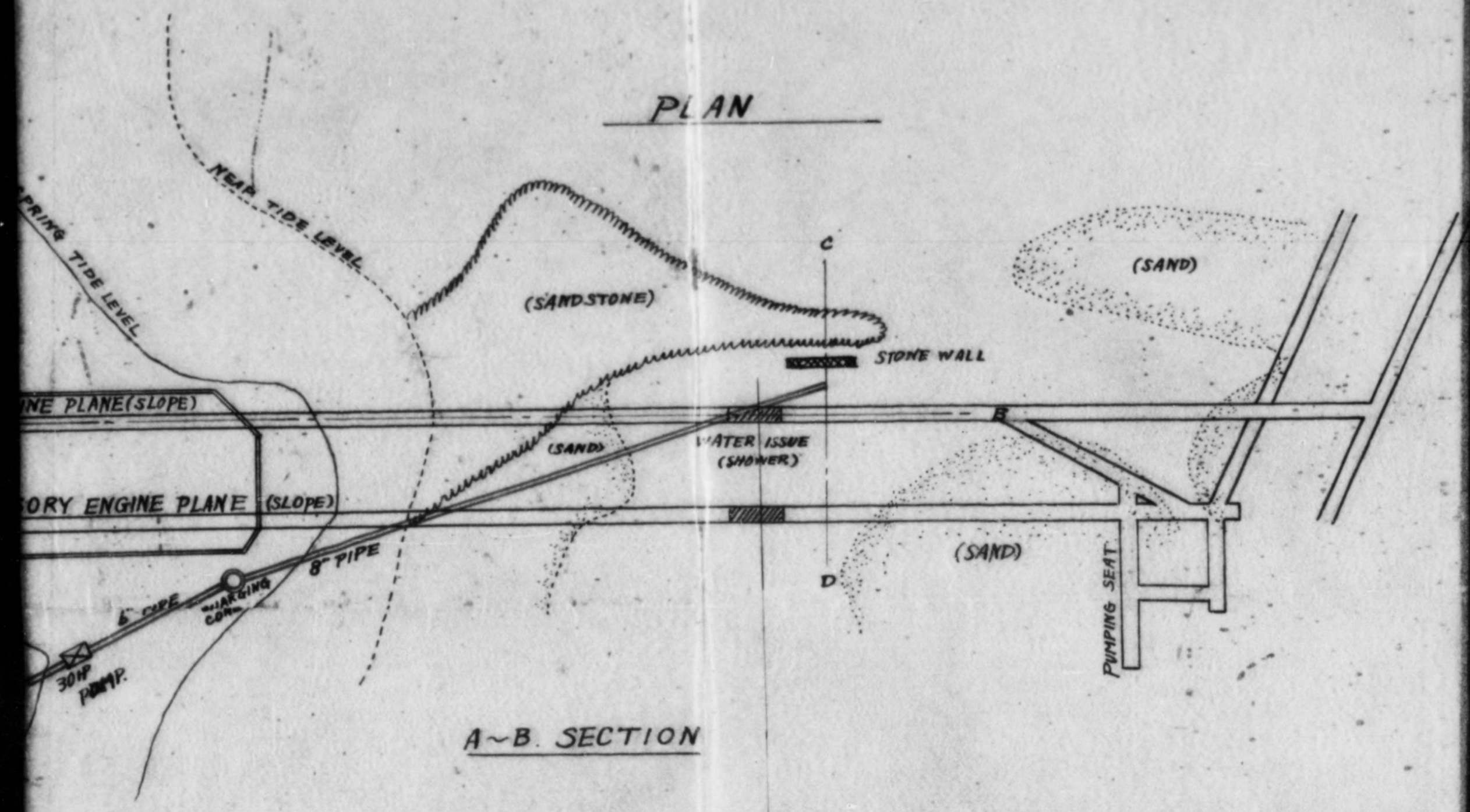

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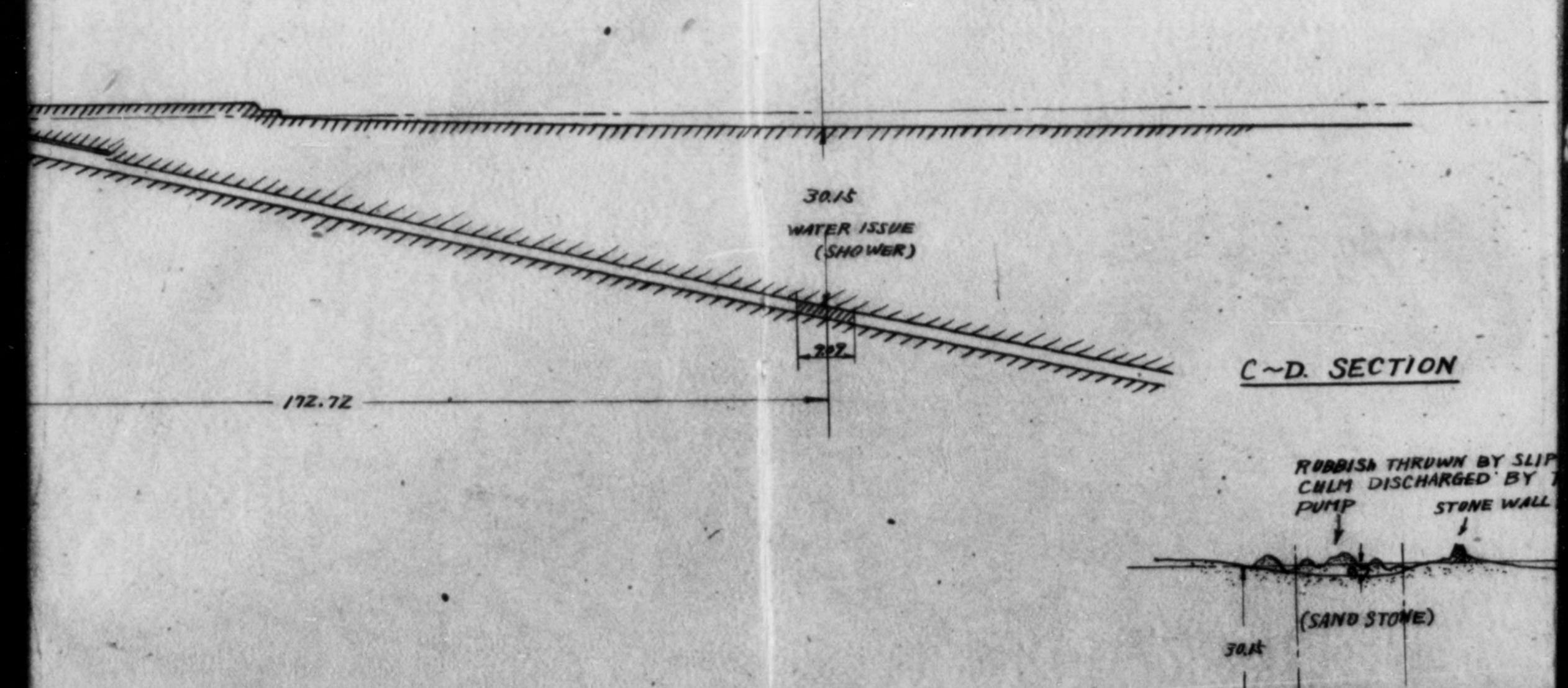

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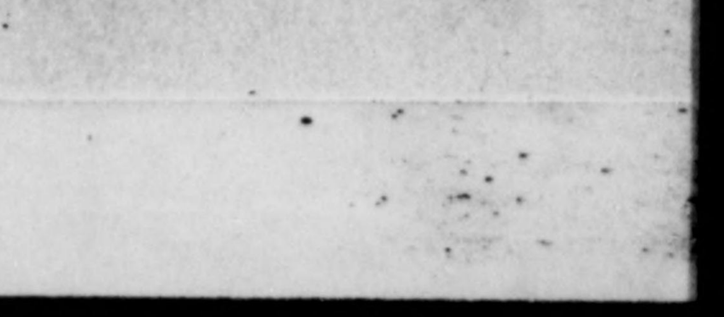

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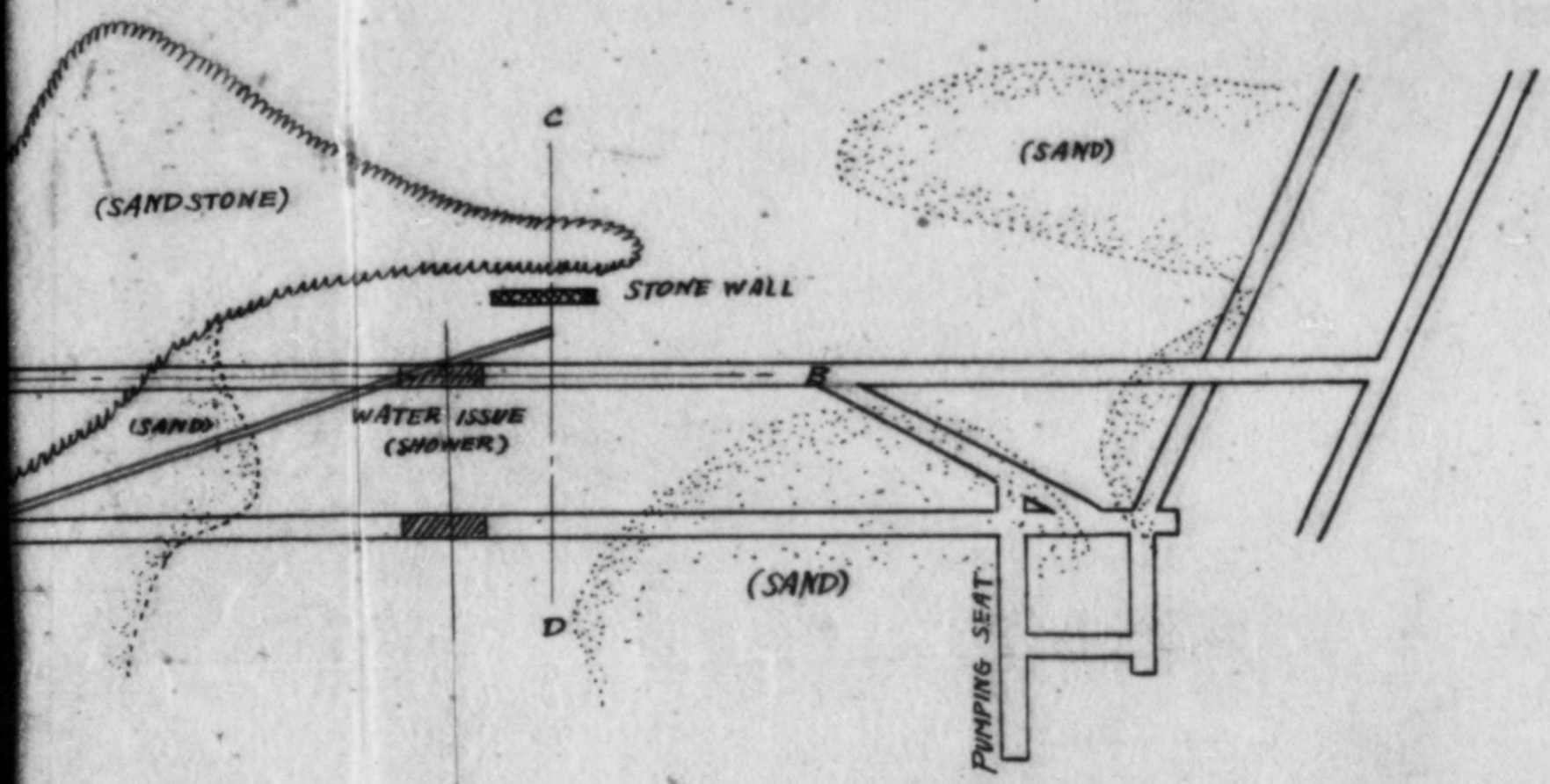
PLAN AND SECTION SHOWING THE PLACE OF SUDDEN ~~issue of water~~ UNDERGROUND AND DEPTH OF SURROUNDING SEA BOTTOM

PLAN



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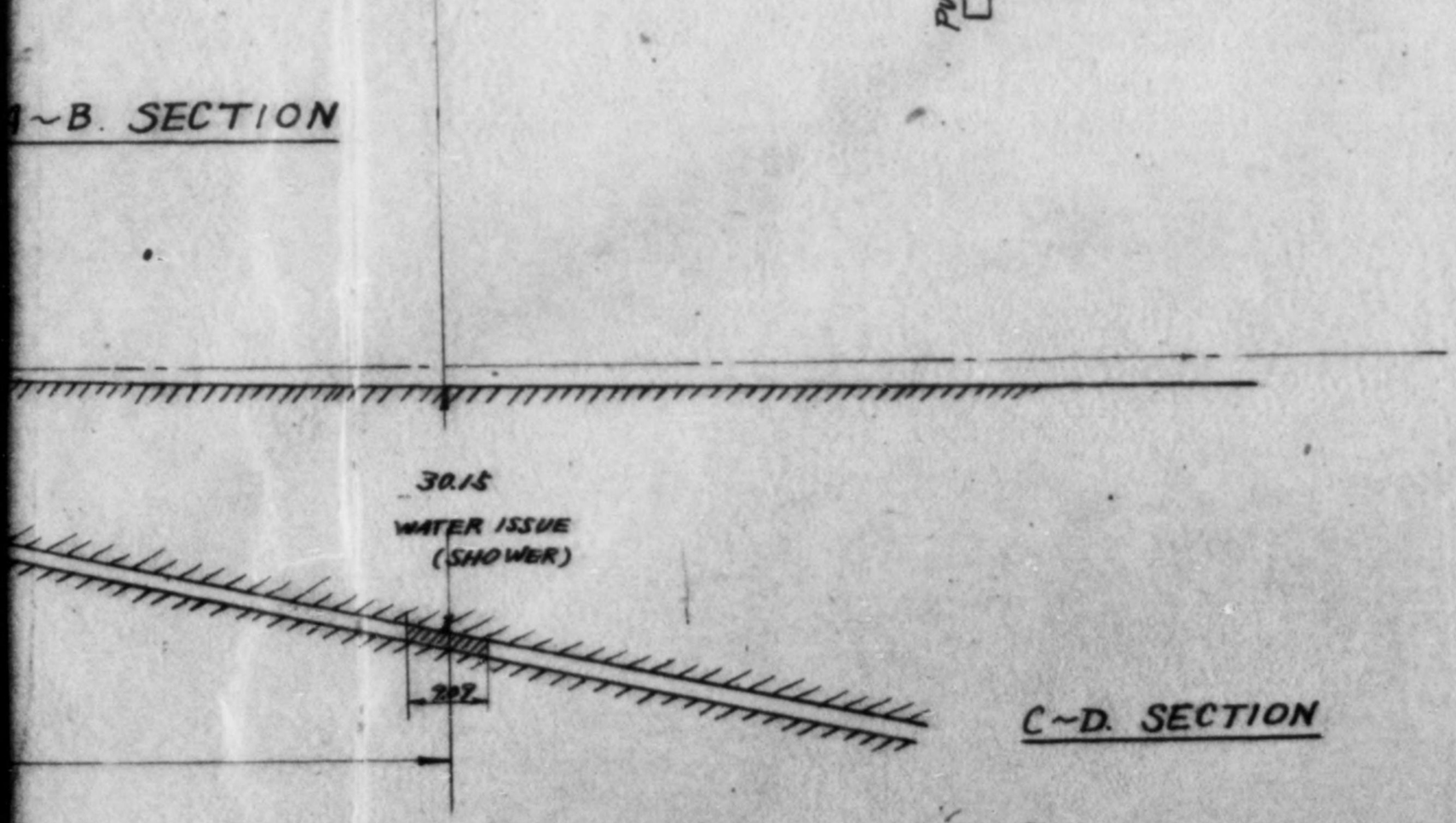

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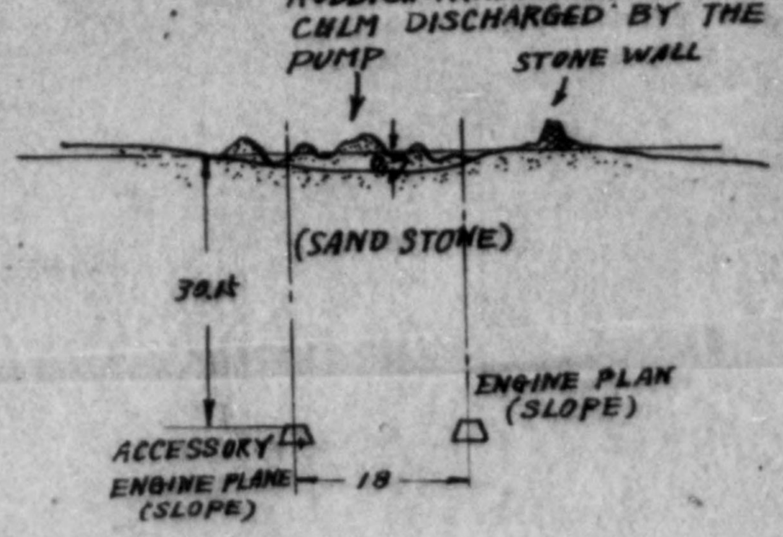

File M-10-4

BASIC: Ltr, Hq Eighth Army, APO 343, AGMGEN 333.5, dtd 21 Jul 1948, subj: "Transmittal of Memorandum for Record ("Examination of Chosei Coal Mine, Ube City, Yamaguchi Prefecture, on 10 June 1948")."

CMGR 333.5 (D-Ki) 1st Ind

Headquarters, Chugoku Military Government Region, APO 317, Kure, Honshu, 27 July 1948

TO: Commanding Officer, Yamaguchi Military Government Team, APO 317

Forwarded for your information.

BY ORDER OF COLONEL SNYDER:

1 Incl:
n/c

JERRY W. TOM
1st Lt, USAF
Adjutant

(1)

C-658

805

HEADQUARTERS EIGHTH ARMY
United States Army
Office of the Commanding General
APO 343

AGMGEN 333.5

SUBJECT: Transmittal of Memorandum for Record ("Examination of Chosei Coal Mine, Ube City, Yamaguchi Prefecture, on 10 June 1948")

TO : Commanding Officer
Chugoku Military Government Region
APO 317

21 JUL 1948

1. Attached as inclosure 1 is a Memorandum for Record, Natural Resources Section, General Headquarters, Supreme Commander for the Allied Powers, file NR 641 (7 Jul 48)MG, 7 July 1948, subject: "Examination of Chosei Coal Mine, Ube City, Yamaguchi Prefecture, on 10 June 1948," prepared by Mr. R.D. MacAfee, Scientific Consultant.

2. The subject memorandum for record will be forwarded to the Yamaguchi Military Government Team.

BY COMMAND OF LIEUTENANT GENERAL EICHELBERGER:

for R. SCHAFER
Lt Col, AGD
Asst Adj Gen

1 Incl:
Memo for Record,
7 July 1948

7395

GENERAL HEADQUARTERS
SUPREME COMMANDER FOR THE ALLIED POWERS
Natural Resources Section

HGS/RYG/RDM/jm
7 July 1948

NR 641 (7 Jul 48)MG

MEMORANDUM FOR: Record

SUBJECT: Examination of Chosei Coal Mine, Ube City, Yamaguchi Prefecture, on 10 June 1948

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Robt D MacAfee

ROBERT D. MacAFEE
Scientific Consultant
Mining and Geology Division

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Copy to:
Yamaguchi MG Tm

YAMAGUCHI MG TM

Incl 1

GEOLOGICAL EXAMINATION OF CHOSEI MINE CLAIMS AND PLANS, UBE CITY, YAMAGUCHI PREFECTURE

1. Four bore holes were drilled some years ago for the purpose of proving continuation of undersea coal seams in undeveloped areas at Chosei mine. The holes are considered inaccurate in coal thickness and depth because they were made by Kazuss-bori (percussion method using bamboo bars), but the existence of coal seams in area drilled is considered to be certain.

2. Correlation of the coal seams between Chosei and Okinoyama-Okiube districts is not definitely now established, although seams have the same name, that is, the name Itsudan and Cha are being used by Chosei Mine Co. According to the engineers of the Okinoyama and the Okiube mines, coal seams in the Chosei claims may be seams of a lower horizon than the Itsudan seam. On the other hand, Coal Bureau engineers think the resemblance of the columnar sections of the coal seam at Chosei (so-called Itsudan) is the same as the Itsudan. The correlation of these seams remains to be established, but it is certain that the majority of Chosei claims contain coal of suitable thickness to be mined.

3. The western part of the area planned to be exploited by Chosei mine should be studied further by rotary drilling, as there is some possibility of erosion of coal seams to the westward due to their wavy contour. At the west of the old third pit, on land, a north-south trending, narrow and shallow syncline is recognized and metamorphosed basement rocks crop out to the west of the Tertiary formations for some distance and extend to the east end of Okiube mine area. From Okiube westward, a number of coal mines are now being worked. Coal seams become shallower to the east; the Okiube mine is situated at the eastern end of that district. The Sanjyaku seam (lowest workable seam) is now being worked there. This seam has maximum dip of 3°30'W. According to recent studies by geologists of Ube Industrial Co,"the fault that is considered to bound Chosei and Okiube districts is <u>not</u> existent".

4. The undersea condition with the thin overburden between coal seams and the sea at Chosei mine requires more surveying drilling before settling on a large development plan, for the following reasons:

(1) The surface of the basement rocks are very irregular (as seen from study of underground rock of Chosei mine) and as shown by the coal seam, which is located near the base rocks. Therefore, it is probable that the coal seam is affected by irregularity of basement topography.

(2) In the Okinoyama mine, which is extensively developed, there are undulations of the coal seams (wavy geological structure) some of these waves have a difference of level of about 30 meters between highest and lowest points of the undulation. This kind of undulation will cause suspension of mining where cover rocks are too thin, as in the Chosei mine at certain points.

5. The present development slope and level tunnels have been run in an unfavorable place, where the coal seam is not far below sea bottom and is too near to the unconformity surface of basement rocks to be safe. The most basal

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part of Tertiary formation, consisting of subangular gravels of schists and serpentine derived from basement rock, is not quite strong enough to resist erosion and also there may be water-bearing strata in some places in these upper beds. (A special case of this condition in the Chosei mine was that sea water came down through fractures, causing roof falls). On the other hand, water in basement rock, generally, has no direct connection to sea-water. Therefore, it is desirable that tunnels should be run in basement rocks until they strike Tertiary sediments with sufficient overburden about them to be safe from sea water seepages. If present tunnels should be maintained, the sea area above slope and part of the level will have to have a barrier seawall put in and be filled with clay to a depth above sea level.

6. Conclusions: (1) More surveys are needed in the western half of planned mining area; (2) though this area is promising in regard to coal reserves (probably over 25,000,000 tons),the development plan should be revised, or reclamation of sea area near shore should be carried on by extensive filling, before opening or continuing of mine as it is now set up.

Sakakura

K. SAKAKURA
Chief Coal Geologist, Mitsubishi Mining Co.